

CLAIMS

What is claimed is:

1. A process for reducing the hydrogenation activity of a catalyst comprising a crystalline molecular sieve and at least one hydrogenation metal selected from the group consisting of a Group VIIB metal, a Group VIII metal, and mixtures thereof, said process comprising:  
contacting the catalyst with hydrogen under sufficient conditions of temperature and pressure and for sufficient time to reduce the hydrogenation activity of the catalyst.
2. The process recited in Claim 1, wherein said molecular sieve has an intermediate pore size.
3. The process recited in Claim 2, wherein said molecular sieve has a structure selected from the group consisting of MFI, MEL, MTW, EUO, MTT, HEU, FER, MFS, and TON.
4. The process recited in Claim 1, wherein said molecular sieve is selected from the group consisting of ZSM-5, ZSM-12, ZSM-22, ZSM-23, ZSM-34, ZSM-35, ZSM-38, ZSM-48, ZSM-50, and ZSM-57.
5. The process recited in Claim 4, wherein the addition hydrogenation activity of the treated catalyst is reduced at least 40 percent in comparison to the untreated catalyst.
6. The process recited in Claim 4, wherein the hydrogenolysis activity of the treated catalyst is reduced at least 50 percent in comparison to the untreated catalyst.

7. The process recited in Claim 2, wherein the conditions include a pressure of at least 700 kPa, a temperature of at least 316°C, and a time of at least 4 hours.
8. The process recited in Claim 2, wherein the conditions include a pressure of at least 1034 kPa, a temperature of at least 371°C, and a time of at least 8 hours.
9. The process recited in Claim 2, wherein the conditions include a pressure of at least 1400 kPa, a temperature of at least 427°C, and a time of at least 10 hours.
10. The process recited in Claim 7, wherein said hydrogenation metal is present in said catalyst in an amount of from about 0.03 to about 3 percent by weight based on the total weight of said catalyst.
11. The process recited in Claim 10, wherein said hydrogenation metal is selected from the group consisting of platinum, rhenium, and mixtures thereof.
12. The process recited in Claim 11, wherein said hydrogenation metal is incorporated with said molecular sieve by ion exchange.
13. The process recited in Claim 7, wherein said crystalline molecular sieve is MFI.
14. The process recited in Claim 13, wherein said catalyst further comprises a binder.
15. The process recited in Claim 14, wherein said binder is silica or alumina.
16. The process recited in Claim 13, wherein the hydrogenolysis activity of the treated catalyst is reduced at least 75 percent in comparison to the untreated catalyst.

17. The process recited in Claim 16, wherein said crystalline molecular sieve is ZSM-5.

18. The process recited in Claim 13, wherein said catalyst further comprises a selectivating agent to enhance the para-selectivity of said catalyst.

19. The process recited in Claim 18, wherein said selectivating agent is selected from the group consisting of phosphorus, an alkaline earth metal oxide, boron oxide, titania, antimony oxide, silica, manganese oxide, and coke.

20. The process recited in Claim 17, wherein said hydrogenation metal is rhenium.

21. The process recited in Claim 17, wherein the treated catalyst is substantially free of hydrogenolysis activity.

22. The process recited in Claim 11, wherein said crystalline molecular sieve is ZSM-12.

23. A process for treating a catalyst comprising ZSM-5 and least one hydrogenation metal selected from the group consisting of platinum, rhenium, and mixtures thereof to reduce the hydrogenolysis activity of the catalyst, said process comprising:

contacting the catalyst with hydrogen at a pressure of at least 700 kPa, a temperature of at least 316°C, and a time of at least 4 hours to reduce the hydrogenolysis activity of the treated catalyst in an amount at least 25 percent in comparison to the untreated catalyst.

24. The process recited in Claim 23, wherein the hydrogenolysis activity of the treated catalyst is reduced at least 75 percent in comparison to the untreated catalyst.

25. The process recited in Claim 23, wherein said hydrogenation metal is rhenium.
26. The process recited in Claim 24, wherein said catalyst further comprises binder selected from the group consisting of silica and alumina.
27. A process for the conversion of organic compounds comprising contacting said organic compounds under conversion conditions with a catalyst comprising a crystalline molecular sieve and at least one hydrogenation metal selected from the group consisting of a Group VIIB metal, a Group VIII metal, and mixtures thereof, said catalyst having been treated to reduce its hydrogenation activity by a process comprising:
- contacting the catalyst with hydrogen under sufficient conditions of temperature and pressure and for sufficient time to reduce the hydrogenation activity of the catalyst.
28. The process recited in Claim 27, wherein the conversion conditions include a temperature from about 100°C to about 760°C, a pressure of from about 0.1 atmosphere (bar) to about 200 atmospheres (bar), weight hourly space velocity of from about 0.08 hr<sup>-1</sup> to about 2000 hr<sup>-1</sup>, and a hydrogen/organic, e.g., hydrocarbon compound, molar ratio of from about 0 to about 100.
29. The process recited in Claim 27, wherein said molecular sieve has an intermediate pore size.
30. The process recited in Claim 29, wherein said molecular sieve has a structure selected from the group consisting of MFI, MEL, MTW, EUO, MTT, HEU, FER, MFS, and TON.

31. The process recited in Claim 27, wherein said molecular sieve is selected from the group consisting of ZSM-5, ZSM-12, ZSM-22, ZSM-23, ZSM-34, ZSM-35, ZSM-38, ZSM-48, ZSM-50, and ZSM-57.

32. The process recited in Claim 31, wherein the addition hydrogenation activity of the treated catalyst is reduced at least 40 percent in comparison to the untreated catalyst.

33. The process recited in Claim 29, wherein the conditions include a pressure of at least 700 kPa, a temperature of at least 316°C, and a time of at least 4 hours.

34. The process recited in Claim 29, wherein said organic compounds comprises hydrocarbons.

35. The process recited in Claim 29, wherein said conversion is selected from the group consisting of ethylbenzene dealkylation, the isomerization of one or more xylene isomers, and the transalkylation of polyalkylaromatic hydrocarbons.

36. The process recited in Claim 34, wherein the product of the conversion process comprises xylenes.

37. The process recited in Claim 35, wherein the conditions include a pressure of at least 1034 kPa, a temperature of at least 371°C, and a time of at least 8 hours.

38. The process recited in Claim 35, wherein said hydrogenation metal is selected from the group consisting of platinum, rhenium, and mixtures thereof and is present in said catalyst in an amount of from about 0.03 to about 3 percent by weight based on the total weight of said catalyst.

39. The process recited in Claim 38, wherein said crystalline molecular sieve is MFI.

40. The process recited in Claim 39, wherein said catalyst further comprises a binder selected from the group consisting of silica or alumina.
41. The process recited in Claim 38, wherein the hydrogenolysis activity of the treated catalyst is reduced at least 75 percent in comparison to the untreated catalyst.
42. The process recited in Claim 16, wherein said crystalline molecular sieve is ZSM-5.
43. The process cited in Claim 16, wherein said crystalline molecular sieve is ZSM-12.
44. The process recited in Claim 31, wherein said catalyst further comprises a selectivating agent to enhance the para-selectivity of said catalyst and said selectivating agent is selected from the group consisting of phosphorus, an alkaline earth metal oxide, boron oxide, titania, antimony oxide, silica, manganese oxide, and coke.
45. The process recited in Claim 41, wherein said hydrogenation metal is rhenium.
46. The process recited in Claim 45, wherein the treated catalyst is substantially free of hydrogenolysis activity.
47. The process recited in Claim 46, wherein the conditions include a pressure of at least 1400 kPa, a temperature of at least 427°C, and a time of at least 10 hours.
48. The process recited in Claim 27, wherein said process is the dealkylation of ethylbenzene and said crystalline molecular sieve comprises ZSM-5.

49. The process recited in Claim 27, wherein said process is the transalkylation of polyalkylaromatic hydrocarbons and said crystalline molecular sieve comprises ZSM-12.